Center Innovation Fund: JPL CIF

High Operational Temperature MWIR detectors with optical concentrators

Completed Technology Project (2015 - 2016)

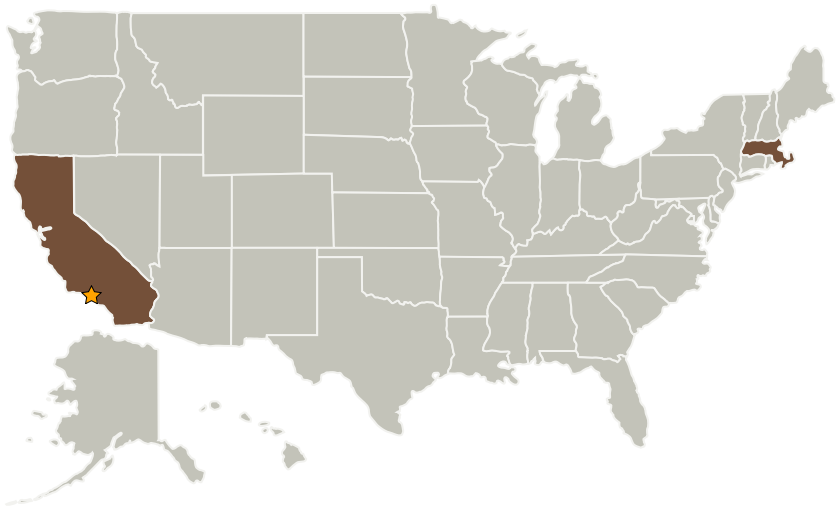
Project Introduction

The goal of this work is to develop high performance mid-wavelength (MWIR) barrier infrared detectors (BIRDs) operating at temperatures accessible to compact single-stage thermoelectric coolers. High operational temperature can be achieved by integrating detectors with optical concentrators based on microlenses or novel flat optical elements. Objectives: Design and theoretically evaluate performance of optical concentrator based on microlenses and on flat optical elements. Develop MWIR BIRD monolithically integrated with optical concentrator. Demonstrate operation of integrated detectors at temperatures accessible with a single stage thermoelectric cooler (T > 210K).

Anticipated Benefits

Potential applications: High QE, low dark current mid-wavelength infrared detectors operating at temperatures accessible to compact single-stage thermoelectric coolers (T>210K) will benefit infrared spectrometers such CIRIS for outer planet missions: Enceladus Multiple Flyby Mission; Trojan Asteroid Mission; Titan Saturn System Orbiter; Io Observer Mission. Follow-On options: PICASSO; Army; MDA; NRO DII.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Harvard University	Supporting Organization	Academia	Petersham, Massachusetts

Primary U.S. Work Locations	
California	Massachusetts

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Project Management

Program Director:

Michael R Lapointe

Program Manager:

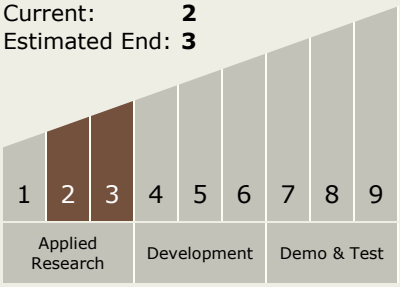
Fred Y Hadaegh

Principal Investigator:

Alexander Soibel

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes